

A N N U A L R E P O R T

Stimulating Science in a Unique Setting

RESEARCH UPDATE IN NEUROSCIENCE FOR NEUROSURGEONS (RUNN)

OCTOBER 21–28, 2006

Sponsored by:

THE SOCIETY OF NEUROLOGICAL SURGEONS

Course Directors:

ALLAN H. FRIEDMAN, M.D.

ROBERT M. FRIEDLANDER, M.D.

Co-Directors:

**BRUCE ANDERSEN, ISSAM A. AWAD, HENRY BREM,
ROBERT J. DEMPSEY, CHARLES HODGE, JR.,
AND EDWARD OLDFIELD**

Course Coordinator:

KAREN KOENIG

Mission Statement

The Mission of the course Research, Update in Neuroscience for Neurosurgeons (RUNN), is to provide an introduction to and update of the latest concepts, hypotheses and methods of neurobiology and neuroscience relevant to neurological surgery. These are presented by accomplished neuroscientists in an atmosphere emphasizing scientific rigor, highlighting models of career development for neurosurgeon-scientists, and illustrating potential future neurosurgical applications. A milieu of total immersion in scientific discourse is designed to foster creative discussions among neurosurgical trainees and faculty. Participants are instructed on selecting a research topic and mentor; designing hypothesis driven experiments; and writing grants. The course is designed to stimulate neurosurgical trainees to participate in basic, translational, and clinical research relevant to the practice of neurological surgery.

Historical Background and Setting

The RUNN course was the brainchild of Henry Schmidek, formerly of Harvard University and the University of Vermont. The course was conceived in response to the anticipated expansion of neurosciences, which he predicted in the early 1980's. The course was to combat what he perceived as potential illiteracy in basic neurobiology that he feared would weaken the specialty of neurosurgery. Dr. Schmidek's RUNN Course has been instrumental in setting the course of academic neurosurgeons.



As so many neuroscientists from New England, Dr. Schmidek was very familiar with the Marine Biological Laboratory (MBL) at Woods Hole, Massachusetts. Established in 1888 as a non-profit institution devoted to research and education in basic biology, the MBL has been called “the uniquely national center for biology in this country” (Lewis Thomas, *The Lives of a Cell*). Scientists and students throughout the world come to MBL to conduct research, teach, study and collaborate. They often use the diverse and abundant organisms found in surrounding waters as model systems. Here research ships leave everyday to study the pristine waters around Martha's Vineyard sound and to collect and maintain more than 200 species of marine life. There are 230,000 square feet of research space and a splendid



library with an extraordinary repository of books and journals and incredible electronic connectivity to everything biological. It is here that the giant squid axon was (and continues to be) so closely studied unfolding the splendid story of molecular mechanisms of neural function. There are incredible microscopy facilities, numerous

amphitheaters and teaching facilities, a quintessential scientific community in true life and work, and a magnificent setting for creativity and scholarly productivity. And there is Swope Hall, a simple dormitory sleepily straddling a quaint harbor, with a friendly staff that knows how to host students and scholars. It is all in Woods Hole, that lovely little spot and ideal gateway, along the magnificent coast of Cape Cod and nearby islands. With miles of bicycle trails and nearby ferries, the only competition to diligent scholarship at Woods Hole is the inspiring call of nature.

It is here that Henry Schmidek cast his RUNN course, and lobbied other residency program directors to send their trainees once a year. By the mid-1980's it was an established offering for two weeks each fall, immersing neurosurgery residents from New Orleans to Saint Louis, from Minnesota to Maryland, and from San Francisco to New York city. The faculty included scientists from the MBL, demonstrating microscopy and dissection and scientists from the New England universities who would drive to MBL for one or two days to participate in RUNN. There would also be neurosurgery's rising academic stars as role models, and wiser icons telling their tales of successes and challenges in the laboratory.

There was nothing like it in neurosurgical education, and there still is not. The founding mission of the RUNN course remains relevant today, and its culture and milieu remain as appealing. This crown jewel of American neurosurgical education was adopted in the late 1980's by the American Association of Neurological Surgeons (AANS) and later by the Joint Committee on Education of the AANS and the Congress of Neurological Surgeons (CNS). This endorsement and administrative oversight by organized neurosurgery heralded an era of expansion and uninterrupted success under the Directorship of Charles Hodge, of Syracuse, New York, with his lovely wife Cathy shepherding the Course as its coordinator. In the mid 1990's Dr. Hodge became co-Director, passing the helm of Directorship to Cordell Gross, of Burlington, Vermont. Linda Gross served as Course Coordinator.

During this period, Charlie and Cordell cultivated a core of devoted faculty from the MBL, Syracuse, Vermont, Harvard, Brown, the National Institutes of Health (NIH), and other institutions who would participate on a regular basis as faculty. A requirement for faculty participation remains — that the individual be an active and



accomplished scientist, speaking on topics he/she actively investigates, and that he/she be an effective speaker. Only those who are highly rated by the neurosurgical trainees would be invited again. Many would dazzle and inspire casting truly unforgettable lectures or discussions. The days would be filled with lectures, unhurried, with plenty of time for discussion. There would be long blocks of time for reading in the library, or for creative and vivid discussions with beer, wine and snacks late into the night. Friendships would be forged among attendees, and research ideas and even an occasional scholarly career would be hatched. All attendees stay at the dorm at Swope Hall, where the legendary cafeteria is like no other, and the views from each simple bedroom (many shared by two residents) as memorable.

Because of untimely illness in 1998 Dr. Gross asked to step down from the Directorship of the RUNN Course, which he had grown to love so much. The opportunity of change of leadership allowed a re-examination and re-commitment to the Mission and core values of the RUNN Course. The AANS and CNS asked the Society of Neurological Surgeons (SNS) to assume sponsorship and oversight of the course. Established in 1920 the SNS is known in neurosurgical lore as the “Senior Society” or organization of North American residency Program Directors. The SNS would insure Program Directors’ continued commitment to this unique educational offering, and ensure residents’ continued participation.

In 1999, the leadership of the RUNN Course was entrusted to Issam A. Awad. Dr. Awad broadened the goals of the RUNN Course to educate neurosurgical residents in formulating hypothesis driven experiments, establishing laboratories and writing grants. To this end, several neurosurgeons who headed successful basic science laboratories were added to the faculty. The Society owes a debt of gratitude to Cathy Awad who administered the Course during Dr. Awad’s tenure. Cathy coordinated everything from “T” shirts to accommodations to finances.

RUNN Course Leadership

In 2004, Dr. Awad passed the baton of leadership to Allan H. Friedman (Duke University) and Robert M. Friedlander (Harvard) as the new Directors of the Course. The Co-Directors of the Course are Issam A. Awad (Northwestern), Bruce Andersen (Idaho Neurological Institute), Henry Brem (Johns Hopkins), Robert J. Dempsey (University of Wisconsin) and Charles Hodge, Jr. (SUNY at Syracuse). Dr. Andersen works closely with Jim Gailbraith and Paul Gallant (both of the National Institutes of Health) on the squid lab and microscopy workshop. Course Coordinator, Karen Koenig, works throughout the year to insure RUNN is executed flawlessly, managing the organization, administration and accounting of the Course.

The 2006 RUNN Course Curriculum: Tradition and Innovation

The founding mission and core values of the RUNN Course remained unchanged. The SNS Executive Committee (representing North American Residency Program Directors) rearticulated its commitment to the course and its leadership.

In response to recent course evaluations and discussions with Program Directors and residents, the course was shortened in 1999 from two weeks to one week with travel days on adjacent weekends. The one and one-half hour length of individual lectures allows for stimulating interaction between the lecturer and the participants. Two such lectures are given each morning, two each afternoon, and one each evening. Curriculum content was reshaped to include lectures covering the spectrum of molecular, cellular and systems neuroscience. Lectures covered topics on molecular genetics, signaling and receptors, stem cells, cell death, regeneration, oncogenesis, glial barriers, vascular tone and phenotype, cognitive information science, circuit modeling, and higher cortical function. Although many of the lecturers return, their material is surprisingly fresh reflecting new discoveries made in their labs. Many of the lectures were given by practicing neurosurgeons with active funded laboratories. There were tours of the MBL laboratories and the very popular microscopy seminar. There were discussions on academic career development, grantsmanship, history and philosophy of science and the scientific method, and history of the MBL. And there were the traditional opening get-acquainted reception and Course Orientation, and the farewell Clambake and certificate ceremony.

The 2006 Special Lecture, “Genes and Small Molecules that Extend Lifespan” was delivered by David Sinclair, Ph.D., Harvard University Medical Center. This was an outstanding talk on the use of small molecules to thwart the aging process. The good news is that such molecules are present in red wine. The bad news is that you would need to drink over one hundred glasses each day.

The collegial atmosphere at Swope Hall remained unchanged, as were the memorable late night sessions with snacks, beer and wine and the very late night sessions at Captain Kidd’s where residents discussed everything from research topics and career paths, to residency training, to NFL football. Each attendee received a complimentary copy of either *Fundamentals of Neuroscience*, edited by Zigmond, Bloom, Landis, Roberts, and Squire (Academic Press



1999), or the Third Edition of Neuroscience, Edited by Purves, Augustine, Fitzpatrick, Hall, LaMantia, McNamara and Williams. These books are magnificent references to topics covered in the lectures, and outstanding resources for future study.

A Splendid Cast of Faculty

The faculty (see list), are world-class scientists who

are able to present their work in a stimulating fashion. There were 30 faculty and 8 directors, representing an extraordinary student/faculty ratio of 2/1. Attendees were mesmerized by the dynamic speakers and post lecture discussions were lively and probing. The residents discussed personal choices in research commitments and career direction with the invited speakers. Many faculty members had participated in the RUNN Course for several years, and all promised to come again if invited. The Course evaluations filled out by the attendees are used to make modifications in the course's speakers and structure.

An Enthusiastic Cast of Attendees

There were 72 attendees from Programs (see list) representing programs throughout the United States, Canada, Puerto Rico and Portugal. The reshaped course is ideal for young attending neurosurgeons just embarking on their academic career. Our goal is to attract one neurosurgeon from each neurosurgical program in North America. We will work hard until we achieve representation of at least one participant from each North American Program.

Our participants continue to be enthusiastic. It is exciting to see the participants swept up in the lectures and spontaneously confronting the lecturers with insightful questions. If this group is representative of neurosurgical residents, the future of neurosurgery looks very bright.

Course Report by Resident Attendees: Ben Waldau, M.D., Ph.D

Neurosurgical Resident, Duke University Hospital

The tradition of the RUNN course continued this year with one week of outstanding lectures given by world-renowned pioneers in basic and clinical neuroscience. For the 22nd time neurosurgery residents from all over the US came to the MBL in beautiful Cape Cod to learn about the most recent advances in neuroscience.

The cast of scientists presenting at the conference was remarkable. We are not talking about the research presentations that most of us are used to where someone reports about the advances and drawbacks of a few months of work in the lab. Most of the presenters were look-

ing back at their accomplishments of years in science delineating how they started out and which thought processes led them to become the successful researchers that they are. All of the speakers were pioneers in their fields who published their work in high-ranking journals. A grading system from previous RUNN courses helped to assure that only speakers the audience enjoyed would be invited again. Some of the presenters were able to combine their careers of neurosurgery and neuroscience and special attention was devoted on how to set up a lab while you operate on several days during the week.

Keynote speaker this year was David Sinclair from Harvard who has done ground-breaking work in the field of aging. He presented recent research showing that resveratrol, a compound found in red wine, improves health and survival of mice on a high-calorie diet. At the time the RUNN course took place the presented data had been accepted but not yet been published in Nature so some of the conference attendees tried to buy stocks of companies marketing resveratrol.

Topics were this year again very diverse ranging from the molecular biology of stroke to gene therapy of brain tumors, brain-machine interfaces and physiological disc repair of the spine. Marc Simard showed new data that blocking the sulfonylurea receptor 1 (SUR1) with glibenclamide reduced cerebral edema, infarct volume and mortality by 50 percent in a stroke model. Leigh Hochberg presented human data on intracortically implanted brain-machine interfaces from his July Nature publication. Jerry Silver showed how to achieve functional regeneration beyond a hemisection lesion of the adult rat spinal cord with a peripheral nervous system graft. And these are only a few examples of the fascinating lectures that were given during the course of the week.

Although the days were filled with lectures, there was always enough time for social events. Many conference attendees used the beautiful weather to take a run around the light house. Some went on a trip to Boston one night. Almost everyone went on the boat trip cruising up and down the shore and drinking ice-cold beer in the freezing breeze. To some Captain Kidd, the only off-season bar at Woods Hole, became a second home during the conference week. A lot of information was exchanged on programs and resident life, and new friendships were formed.

The week concluded with a delicious lobster meal before the residents parted to head back to their programs. The setting of the RUNN course and the course itself is unique, and I am sure many generations of aspiring physician scientists in neurosurgery will continue to be attracted to Woods Hole to learn about the most recent advances in their field.

Christopher P. Demers, M.D.

Neurosurgical Resident from Brown University

The RUNN Course has been one of the most memorable highlights of my neurosurgical education. This year, more than 71 residents spent a week free of patient care responsibilities in a calm, idyllic and stimulating setting. We immersed ourselves in interactive lectures that refreshed our interest in the neurosciences and neuro-

surgery and reminded us that we have the potential to be accomplished clinicians, academicians and patient advocates.

The breadth of the lecture topics was wide, and included very helpful talks from just about every aspect of academic neurosurgery. The week began with several discussions about how to develop an academic neurosurgical career path and navigating the world of NIH funding. We then covered evolving basic neuroscience research, applied clinical neurosurgery, and more esoteric, but equally engaging lectures on the pace of scientific achievement and the molecular mechanisms of aging.

Just as interesting was the opportunity to meet and have in-depth discussions with peers, lecturers and other faculty outside the lectures: at after-lecture happy hours, meals or gatherings at Captain Kidds's, the year-round pub which is a short walk away.

Generous Educational Grants

We acknowledge generous sponsorship level grants, from Gold

Contributor  and Silver Contributors  and , and **STRYKER**

These grants paid for the purchase of textbooks for each participant and subsidized faculty travel and honoraria costs.

Toward RUNN 2007 and Beyond!

We have finalized space contract with the MBL for the years 2007 through 2009. RUNN 2007 will take place from October 20-27, 2007. The SNS and the Course Co-Directors and Coordinator are committed to maintaining the best of the RUNN Course, while continuing to strive to enhance curriculum content and value to each registrant. We continue to call on Residency Program Directors to support this unique gem of North American Neurosurgical Education, by providing their residents the opportunity of exposure to, and update on the best of neurobiology. We hope that future courses will also attract fellows and young faculty at formative states of their academic careers, and to practicing neurosurgeons who want to get reacquainted with the future of neurosurgery!

RUNN Web Site
<http://www.societyns.org>

Future Course Dates

Marine Biology Laboratory

Woods Hole, MA

October 20-27, 2007

October 18-25, 2008

October 17-24, 2009



RUNN Course Attendees October 21–28, 2006

Participant

Abdu, Emun

Ahmed, Azam

Amankulor, Nduka

Asadi, Kaveh

Bauer, David

Binning, Mandy

Boco, Tibor

Bradbur, Jamie

Brumblay, Hunter

Burkett, Clinton

Cardona, Rafael

Carlson, Andrew

Chang, Louis

Cook, Douglas James (DJ)

Demers, Christopher

DiLorenzo, Daniel

Ebersole, Koji

Edgar, Rick

Elliott, Robert

Fabiano, Andrew

Farhavar, Arash

Finn, Michael

Francis, Todd

Fulop, Steven

Gantwerker, Brian

Ghostin, Jimmy

Gould, Grahame

Governale, Lance

Grande, Andrew

Haque, Raqeeb

Helms, Jody B.

Herrera, Sebastian

Hoepflich, Mark

Hughe, Samuel

Institution

Oregon Health Science
University

University of Wisconsin

Yale University

Ohio State University

University of Alabama,

Birmingham

University of Utah

Rush University, Chicago

Indiana University

University of Michigan

Tulane University

University of Puerto Rico

University of New Mexico

University of Maryland

University of Toronto

Brown University

Methodist Hospital,

Houston Texas

New Jersey Medical School

Ohio State University

New York University

SUNY–Buffalo

University of Rochester

University of Utah

Wayne State University

Case Western, Cleveland

Case Western, Cleveland

University of Vermont

Yale University

Brigham & Women

University of Cincinnati

Columbia University

University of TN

University of Illinois, Chicago

Wayne State University

Oregon Health Science

University

Iguchi, Mark
Janson, Christopher
Jennings, Jennifer
Johnston, James
Kanaan, Hilal
Kaufman, Christian
Kazina, Colin
Kim, Albert
Kim, Peter D.
Kissel, Phillip
Kostov, Dean
Martinez, Joseph
Mavinkurve, Gaurav
Moller, David
Monroe, Timothy R.

Moshel, Yaron
Moulding, Hugh
Nair, Anil
Notariannim Christine
Pandey, Aditya
Patel, Sachin
Placantonakis, Dimitris
Radwan, Tarek
Ramos, Edwin
Ranalli, Nathan
Ranasinghe, Moksha
Scibelli, Stephen
Serleti, Demitre
Shah, Hamid
Shah, Mohsin
Shannon, Larry
Sherr, Gregory
Singleton, Richard
Snyder, Kenneth
Stuart, R. Morgan
Trinidad, Elizabeth
Waldau, Ben
Yanni, Daniel

University of Maryland
University of MN
SUNY–Upstate
Washington University, St. Louis
University of Pittsburgh
University of Rochester
University of Manitoba
Brigham and Womens
Syracuse Upstate
Attending Participant
University of Pittsburgh
Baylor University
Cleveland Clinic
Northwestern University
Medical College
of South Carolina
New York Medical University
Thomas Jefferson University
Albany Medical College
LSUHSC–Shreveport
Thomas Jefferson University
University of Michigan
Weill-Cornell University
Dartmouth-Hitchcock
University of South Florida
University of Pennsylvania
Penn State
Wake Forest University
University of Toronto
Medical College of George
Univ. of Missouri (Columbia)
Rush University, Chicago
University of Minnesota
University of Pittsburgh
SUNY Buffalo
Columbia Presbyterian, NY
University of Texas, San Antonio
Duke University
New Jersey Medical School

FACULTY AND TOPICS

Andersen, Bruce / Galbraith, Jim

*Idaho Neurological Institute / NIH
Squid Lab*

Awad, Issam

*Northwestern University
“Scientific Method: History and Philosophy” and
“Translational and Integrational Research:
Cerebrovascular Malformations as a Disease Model”*

Benowitz, Larry

*Harvard University
“Axonal Guidance and Regeneration”*

Benzel, Edward

Cleveland Clinic

*“On Becoming an Academic Surgeon:
From the Clinic to the Lab and to the Podium”*

Bernstein, Kerry

IBM Corporation

“The Evolution of Our Neuroelectronic Species”

Born, Richard

Harvard Medical School

“The Integrative Action of the Visual System”

Brem, Henry

Johns Hopkins University

“Brain Tumor Therapy”

Chiocca, Nino

Ohio State University

*“Translational Therapeutics for Brain Tumors:
for the Lab to the Clinic and Back”*

Connolly, E. Sander

Columbia University

“Neuroinflammation/Adhesion Molecules”

D’Armore, Patricia

Schepens Eye Institute

“Angiogenesis and Neoplasia”

Dempsey, Robert

University of Wisconsin

*“Putting Scientific Thoughts Together:
What a Reviewer looks for in a Grant or Manuscript”*

Edgerton, V. Reggie

UCLA Medical Center

*“Activity Dependent Mechanisms that Enhance
Sensorimotor Function Following Spinal Cord Injury”*

Friedlander, Robert

Harvard Medical School

“Strategies with NIH Grants”

Gunel, Murat

Yale University

“Signaling Pathways and Neural Cell Fate”

Haglund, Michael

Duke University

*“Optical Imaging of Epileptiform Activity:
From Brain Slices to the Operating Room”*

Hochberg, Leigh

Harvard Medical School

*“Intracortically-based Brain-Computer Interfaces:
Frontiers in Neuroscience and Functional Neurosurgery”*

Macklis, Jeffrey

Harvard University Medical School
*"Neural Precursors and Stem Cells:
Basic and Translational Science"*

Madsen, Joseph

Harvard Medical School
"Neuroengineering: Pulses and Waves"

Oldfield, Edward

National Institutes of Health
"Pathophysiology of Syringomyelia"

Pomeroy, Scott

Harvard University Medical School
"Genomics and Proteomics in Clinical Neuroscience"

Purves, Dale

Duke University
*"Perception as Probability:
New Ideas about Cortical Function"*

Reese, Thomas

National Institutes of Health
"History of the Marine Biological Laboratory"

Rutka, James

University of Toronto
"Developmental Signaling Pathways and Brain Tumors"

Schwob, Jim

Tufts University
"Neural Regeneration and the Olfactory System"

Setton, Lori

Duke University
*"Tissue and Cellular Engineering Approaches to
Regeneration and Repair of Intervertebral Disc"*

Silver, Jerry

Case Western Reserve University
"Glial Barriers and Scarring"

Simard, Marc

University of Maryland
*"The SUR1-regulated NC(Ca-ATP) Channel —
a New Player in CNS Ischemia"*

Sinclair, David

Keynote Speaker
Harvard Medical School
*"Genes and Small Molecules
that Extend Lifespan"*

Walters, Beverly

Brown University
*"An Introduction to Evidence-
Based Neurosurgery"*

